

Digital Arts and Humanities Workshop Series – Spring 2017

Fridays @ noon -- Scholars Commons IQ-Wall

| Date | Topic | Presenter |
|---------|--|----------------|
| Aug. 25 | Intro to Visualization | Michael Boyles |
| Sep. 1 | Intro to Digital Humanities | Tassie Gniady |
| Sep. 8 | Virtual Reality | Bill Sherman |
| Sep. 15 | Intro to R | Tassie Gniady |
| Sep. 22 | Advanced Media | Chris Eller |
| Sep. 29 | Augmented Reality | Chauncey Frend |
| Oct. 13 | R for Text | Tassie Gniady |
| Oct. 20 | Network Graphs | David Kloster |
| Oct. 27 | R for Twitter | Tassie Gniady |
| Nov. 3 | 3D Scanning & Printing | Jeff Rogers |
| Nov. 10 | 3D Photogrammetry | Tassie Gniady |
| Dec. 1 | IQ-Tables & Touch-Enabled Software Workflows | David Reagan |



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



IQ-Tables and Touch-enabled Workflows

David M. Reagan
Sr. Analyst/Programmer, Advanced Visualization Lab
Indiana University

December 1, 2017



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



About Today's Workshop

- **Touch hardware**
- **Touch software**
 - **Why (and why not) touch?**
 - **Examples**
 - **How to develop applications?**
 - **How to deploy applications?**
- **How to get help from the AVL**
- **Extra time: simple example walkthrough**



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Touch hardware

Large displays

- IQ-Table
- IQ-Wall
- Touch monitors
- Tablets



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



IQ-Table

- **65" monitor in table orientation**
- **Ultra-HD resolution**
 - **3840 pixels by 2160 pixels**
- **Capable of 80-point multi-touch**
- **Built-in Windows PC**
- **Rolling, tilting stand**



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Why use touch?

- **Engaging, natural user interface**
 - Smart phones → user familiarity
- **Simple logistics**
 - No keyboard, mouse, etc
- **Possibly multi-user, either independent or collaborating**



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Challenges with touch

- **Take special care to teach the user when necessary**
 - **No hover events → no tooltips**
- **Fine interaction can be difficult**
- **Text input can be tricky**
 - **Onscreen keyboard?**



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



AVL touch software history

- **Custom software: 1997-2012**
 - Places & Spaces: Illuminated Diagrams
 - Brownsburg Challenger Center
 - Supercomputing Conference booth kiosks
 - CIB digital signage
 - Digital Golden Book
- **Web: 2016-present**
 - *On the Road* Manuscript
 - Angel Mounds Historical Site
 - Places & Spaces: Macroscopes XI-XIII
 - HathiTrust Research Center Macroscope
 - Paleontology Collection + AR
 - 3D Prints Exhibit
- **Open Exhibits & the AVL Collection Viewer: 2012-16**
 - Cyberinfrastructure Building: Family Night
 - Folklife Festival Collection
 - AVL Collection
 - Audubon Collection
 - Applebee's Collection
 - Science Gateways Collection
 - Arts & Humanities Kiosk
 - Cyberinfrastructure Building: Kiosk
 - Places & Spaces: Maps Collection
 - ATL Collection
 - Indiana History Maps Collection
 - Mathers Museum Collection
 - Pervasive Technology Institute Collection
 - Science On a Sphere Kiosk
 - Science On a Sphere: World Cup Balls
 - Science On a Sphere Collection
 - Living Canvas: Drawings
 - Living Canvas: Chloroplasts
 - Imagining Science Collection
 - Media Digitization and Preservation Institute Collection
 - Biology Collection
 - Institute for Digital Arts & Humanities Collection



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



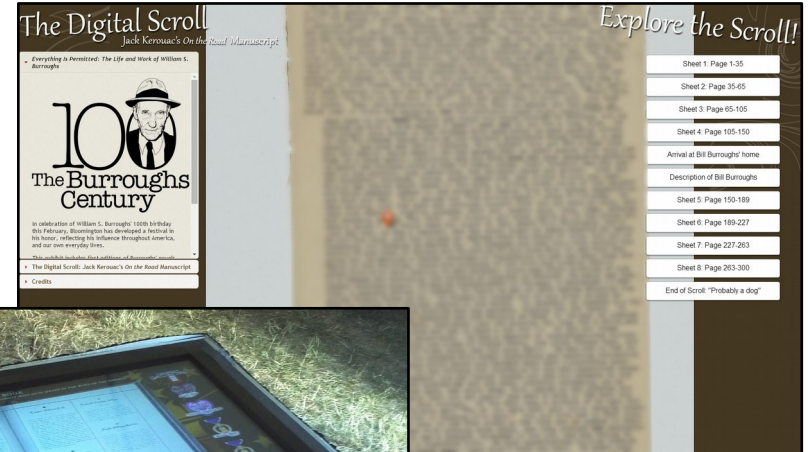
**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Use Case: Digital Interfaces to Scanned Books

- **Digital Scroll**
 - Collaboration with the Lilly Library
 - A multi-touch interface to Jack Kerouac's *On the Road* manuscript
- **Digital Golden Book**
 - Developed with the IU Office of Veteran Affairs and the Digital Library Program
 - Allows users to interact with the Golden Book, which cannot be done with the physical book
 - Permanently housed in the Indiana Memorial Union



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services

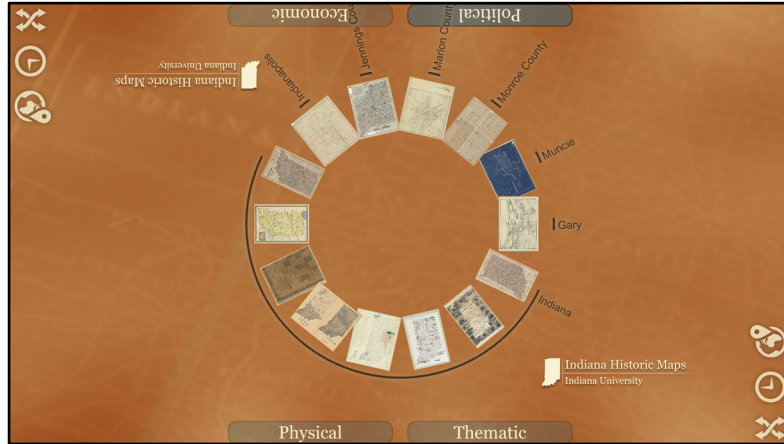


PERVASIVE TECHNOLOGY
INSTITUTE

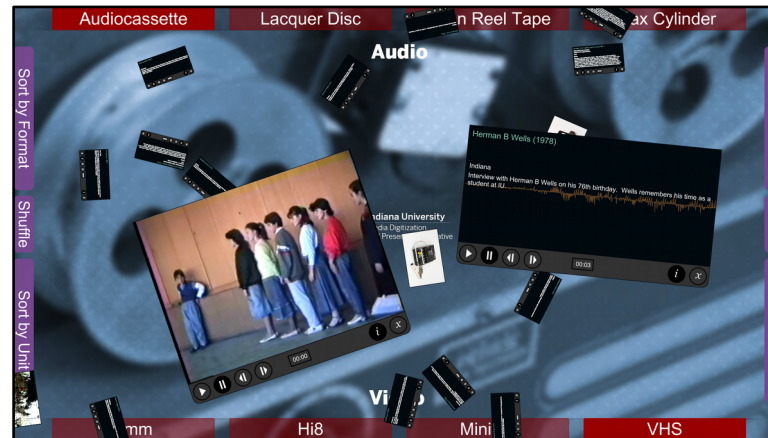
INDIANA UNIVERSITY



Use Case: Collection Viewing



- Your media & metadata
- Sorting & filtering operations
- Circular orientation around the table



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY



Use Case: Angel Mounds State Historic Site



- Collaboration with Glenn A. Black Laboratory of Archaeology
- Learn about the Angel Mounds site and Mississippian culture through high-resolution photos, videos, and metadata
- First installation of the IQ-Table v2 featuring Ultra High Definition resolution
- AVL's first multi-touch application built with web technologies (HTML, CSS, JavaScript)



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY

University Information Technology Services

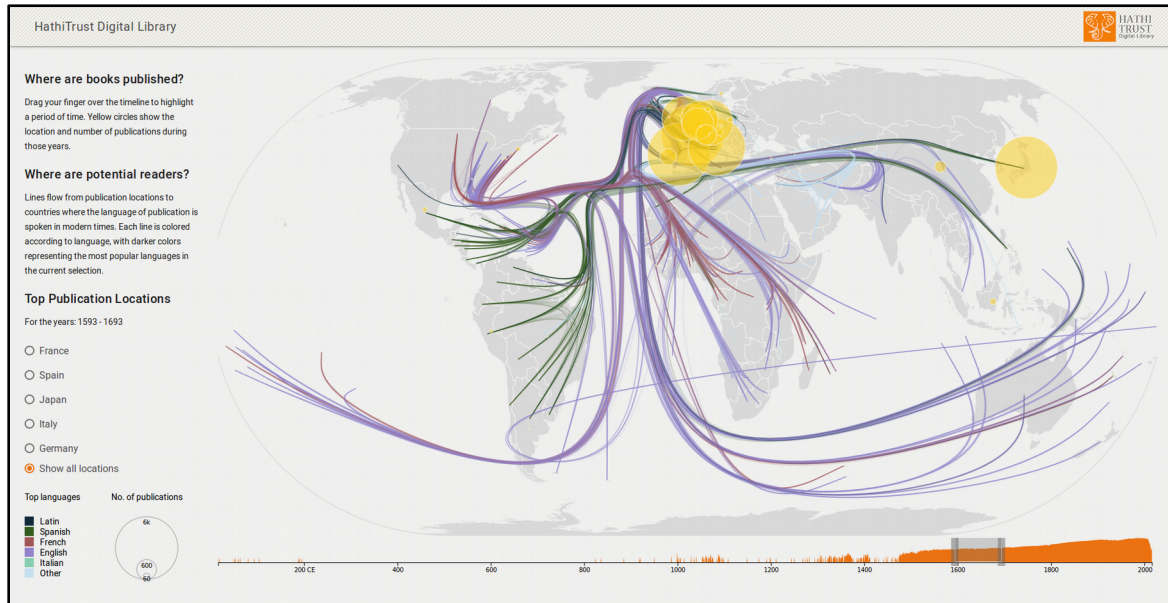


PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY



Use Case: HathiTrust Digital Library Macroscopic



- Collaboration with the IU Cyberinfrastructure for Network Science Center and the HathiTrust Research Center
- Part of the Places & Spaces: Mapping Science exhibit, Iteration XII
- When a user selects a time period, the map updates to show circles illustrating the locations and numbers of publications
- Curves flow out to countries where the publications' languages are spoken today



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY



How to build touch applications?

AVL recommends web technologies

- **Recent maturation of HTML/CSS/JavaScript**
 - **Including tools for entire workflow**
- **Accessible to most developers**
- **Deployable to most platforms**
- **Wide variety of pre-existing libraries and tools**
- **Support for many types of media**



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



How to build touch applications?

- **Very little effort for single-touch interaction**
 - Just like a single-button mouse
- **Multi-touch interaction requires gesture recognition**
 - Tap, press, swipe, pan, pinch, rotate, etc
 - Some content (maps, 3D, etc) may natively support multi-touch gestures
 - Other content can be touch-ified with...



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY





HAMMER.JS

You can touch this



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY

Example step 1: AngularJS ng-repeat

```
<div>
  <md-card ng-repeat="awesomeThing in main.awesomeThings">
    
  </md-card>
</div>
```



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY



Example step 2: Angular Hammer

Hammer gesture recognizers as Angular directives

```
<md-card hm-panmove="card.touchThis"
  hm-pinchmove="card.touchThis"
  hm-rotatemove="card.touchThis"
  hm-panend="card.cantTouchThis"
  hm-rotateend="card.cantTouchThis"
  hm-pinchend="card.cantTouchThis">
  
</md-card>
```



```
/**
 * Process touch event
 */
scope.card.touchThis = function (event) {
  var transform = scope.card.transform;

  newTransform = {
    translate: {
      x: transform.translate.x + event.deltaX,
      y: transform.translate.y + event.deltaY
    },
    angle: transform.angle + event.rotation,
    scale: transform.scale * event.scale
  };

  applyTransform(newTransform);
};

/**
 * Save transform
 */
scope.card.cantTouchThis = function () {
  scope.card.transform = newTransform;
};
```



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY

Example step 3: Angular Material

- Implementation of Google's Material Design in Angular
- We primarily use it for the touch ripple, but also useful for layout, UI components, etc

```
<div>
  <avl-card ng-repeat="awesomeThing in main.awesomeThings | filter:main.query"
    thing="awesomeThing"></avl-card>
</div>

<div style="padding: 20px">
  <h1 class="md-title">Filter</h1>
  <div layout="row">
    <md-input-container>
      <label>Query</label>
      <input ng-model="main.query">
    </md-input-container>
    <md-button ng-click="main.query = ''">Clear</md-button>
  </div>
</div>
```



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY



Example step 4: Google Analytics

- Use familiar web analytics for user tracking
- Automatic page view tracking
- Declarative event tracking

```
<md-button ng-click="main.query = ''"  
  analytics-on="click"  
  analytics-category="Filter"  
  analytics-label="Clear">Clear</md-button>
```



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services

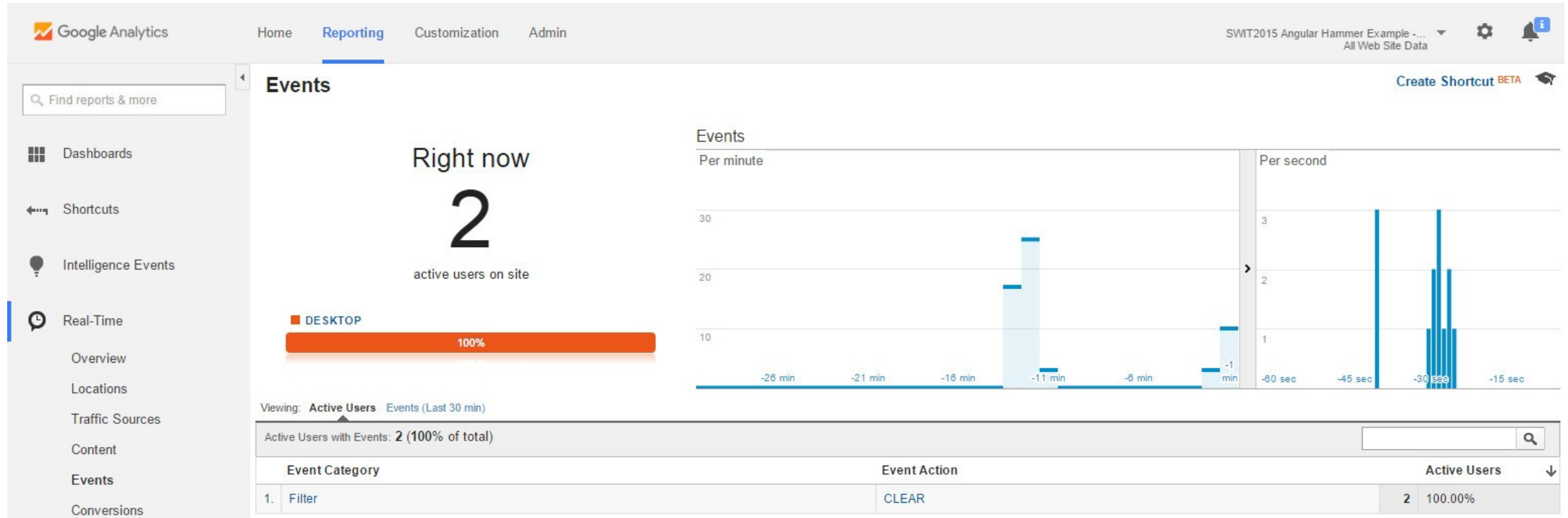


PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY



Example step 4: Google Analytics



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY



How to deploy touch applications?

- **Web browser**
 - Kiosk mode
 - Run simple web server for local file access
- **Desktop application**
 - Use Electron to bundle your webapp with node.js and Chromium
- **Mobile**
 - Use Cordova to bundle your webapp for Android and iOS
 - Newer tools like NativeScript and React Native



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY

How can the AVL help?

- **Hardware lending and purchase recommendations**
- **Software development consulting, support, and training**
- **Need something advanced or custom? Contact us!**

avl.iu.edu
vishelp@iu.edu



**RESEARCH
TECHNOLOGIES**

INDIANA UNIVERSITY
University Information Technology Services



**PERVASIVE TECHNOLOGY
INSTITUTE**

INDIANA UNIVERSITY





RESEARCH TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY INSTITUTE

INDIANA UNIVERSITY



License Terms

- Please cite as: [###__ Insert recommended citation (and IUScholarWorks handle as appropriate)]
- Items indicated with a © are under copyright and used here with permission. Such items may not be reused without permission from the holder of copyright except where license terms noted on a slide permit reuse.
- Except where otherwise noted, contents of this presentation are copyright 2013 by the Trustees of Indiana University.
- This document is released under the Creative Commons Attribution 3.0 Unported license (<http://creativecommons.org/licenses/by/3.0/>). This license includes the following terms: You are free to share – to copy, distribute and transmit the work and to remix – to adapt the work under the following conditions: attribution – you must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work). For any reuse or distribution, you must make clear to others the license terms of this work.



RESEARCH
TECHNOLOGIES

INDIANA UNIVERSITY
University Information Technology Services



PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY

